Environmental Impact Assessment Report

NISA

North Irish Sea Array

Volume 5: Wider Scheme Aspects

Chapter 31
Resource and Waste Management

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31. Resource and Waste Management

31.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents an assessment of likely significant effects from the North Irish Sea Array (NISA) Offshore Wind Farm (hereafter referred to as the 'proposed development') under the heading of resource and waste management from both offshore and onshore infrastructure during the construction, operational and decommissioning phases.

This chapter sets out the methodology followed (Section 31.2), describes the baseline environment (Section 31.3) and summarises the main characteristics of the proposed development which are of relevance to resource and waste management (Section 31.4), including any embedded mitigation. Potential impacts and relevant receptors are identified, and an assessment of likely significant effects on resource and waste management are described (Section 31.5). Additional mitigation measures are proposed to mitigate and monitor these effects if required (Section 31.6) and any residual likely significant effects are then described (Section 31.7). Transboundary effects are considered (Section 31.8) and cumulative effects are summarised in Section 31.9 and detailed in full in Volume 6, Chapter 38: Cumulative and Inter-Related Effects. The chapter then provides a reference section (Section 31.10).

The following appendices accompany this chapter: Volume 11, Appendix 31.1 Legislation, Policy and Guidelines and Volume 11, Appendix 31.2 List of Waste Codes. An offshore waste management plan is included in the Offshore Environmental Management Plan (Offshore EMP) which is contained in Volume 8, Appendix 6.1. A Construction Resource and Waste Management Plan (CRWMP) for construction of onshore infrastructure is included within the onshore Construction Environmental Management Plan (CEMP) which is contained in Volume 8, Appendix 9.1.

The EIAR also includes the following:

- Detail on the competent experts that have prepared this chapter is provided in Volume 8, Appendix 1.1;
- Detail on the extensive consultation (including anything specific to resource and waste management) which has been undertaken with a range of stakeholders during the development of the EIAR is set out in Volume 8, Appendix 1.2; and
- A glossary of terminology, abbreviations and acronyms is provided in Volume 2.

A detailed description of the proposed development including the construction, operation and decommissioning phases is provided in Volume 2, Chapter 6: Description of the Proposed Development – Offshore (hereafter referred to as the 'Offshore Description Chapter'), Volume 2, Chapter 7: Description of the Proposed Development – Onshore (hereafter referred to as the 'Onshore Description Chapter'), Volume 2, Chapter 8: Construction Strategy – Offshore (hereafter referred to as the 'Offshore Construction Chapter') and Volume 2, Chapter 9: Construction Strategy – Onshore (hereafter referred to as the 'Onshore Construction Chapter').

The following aspects of the proposed development are particularly relevant to the resource and waste assessment:

- **Design:** throughout the design for the proposed development, consideration has been given to the minimisation of resource usage and the generation of waste through retention of material on site and material reuse;
- **Construction phase:** waste will be generated from offshore seabed preparation works, offshore installation works, onshore site clearance and onshore excavation. General construction waste and municipal waste will also be generated during the construction phase. During the construction of the proposed development, material usage will be minimised, and material will be reused, where possible;
- **Operational phase:** waste will be generated from maintenance activities related to the operation of the proposed development; and

- **Decommissioning phase:** waste will be generated from the decommissioning of both the offshore and onshore infrastructure related to the proposed development.

Other topics related to resource and waste management, such as construction phase traffic impacts, water quality impacts and mineral resources are considered in the following chapters of the EIAR:

- Construction phase traffic impacts are considered in Volume 4, Chapter 24: Traffic & Transportation;
- Water quality and pollution risk are considered in Volume 3, Chapter 11: Marine Water and Sediment Quality and Volume 4, Chapter 22: Water; and
- Mineral resources are considered in Volume 3, Chapter 10: Marine Geology, Oceanography and Physical Processes, Volume 3, Chapter 11: Marine Water and Sediment Quality, and Volume 4, Chapter 21: Land and Soils.

31.2 Methodology

31.2.1 Sustainable Resource and Waste Management Principles

31.2.1.1 Circular Economy

The principal objective of sustainable resource and waste management is to use material resources more efficiently, where the value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency, there is a need to move from a traditional linear economy to a circular economy, as outlined in Image 31.2.

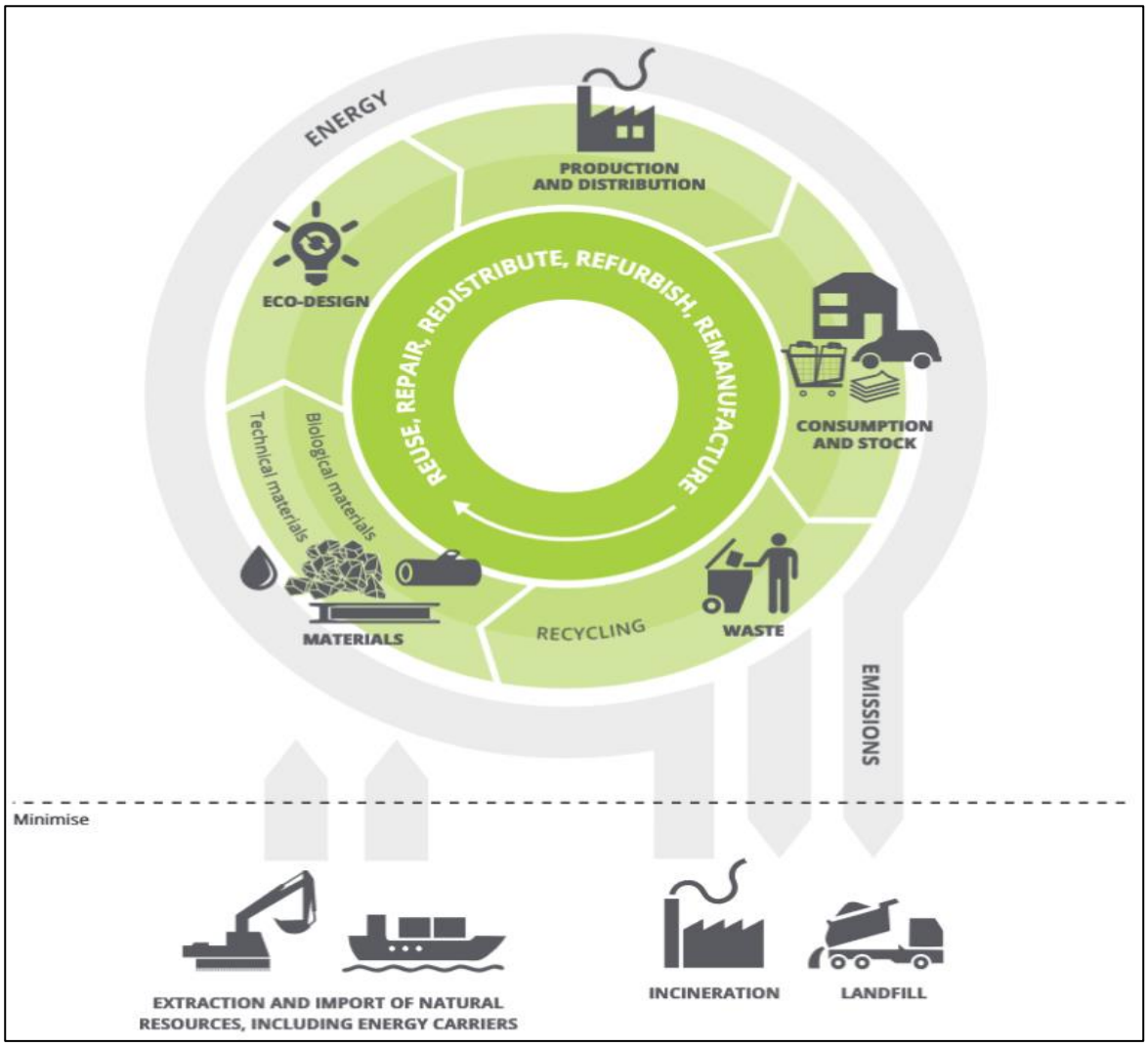

Image 31.1 Simplified model of the circular economy for materials and energy (Source: EEA, 2016)

The Circular Economy and Miscellaneous Provisions Act 2022 defines the circular economy as:

a. *"An economic model and the policies and practices which give effect to that model in which:*

b. *production and distribution processes in respect of goods, products and materials are designed so as to minimise the consumption of raw materials associated with the production and use of those goods, products and materials,*

c. *the delivery of services is designed so as to reduce the consumption of raw materials.*

d. *goods, products and materials are kept in use for as long as possible thereby further reducing the consumption of raw materials and impacts harmful to the environment,*

e. *the maximum economic value is extracted from goods, products, and materials by the persons using them, and*

f. *goods, products and materials are recovered and regenerated at the end of their useful life"*

The European Union (EU) *Circular Economy Action Plan* (European Commission, 2020) notes that:

"…the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance toward keepings its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade."

The European Commission (2020) has adopted a Circular Economy Action Plan - one of the main blocks of the European Green Deal, Europe's new agenda for sustainable growth. The Plan identifies construction as a key area where there are opportunities for resource efficiency and circularity.

The Department of the Environment, Climate and Communications (DECC) published the *Whole of Government Circular Economy Strategy 2022-2023* in December 2021 (DECC, 2021a). The Strategy aims to support and implement measures that significantly reduce Ireland's circularity gap (i.e., a measurement of the total amounts of (re)cycled materials as a proportion of the total material inputs into the global economy each year (DECC, 2021a)), so that Ireland's rate is above the EU average by 2030.

In July 2022, the Oireachtas enacted the Circular Economy and Miscellaneous Provisions Act, 2022. This Act places the Strategy and the commitment to a circular economy on a clear statutory footing. It underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, which retains the value of resources in our economy for as long as possible and which will significantly reduce our greenhouse gas emissions. The Act is a key step in the successful transition of Ireland's economy to a circular economy and is evidence of the State's commitment to the achievement of that goal.

31.2.1.2 The Waste Hierarchy

Where waste is generated, it should be managed in line with the principles of the waste hierarchy (as illustrated in Image 31.2) and set out in Directive 2008/98/EC on waste and repealing certain Directives and Directive 2018/851 of the European Parliament and as implemented by the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011), as amended.

The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource) and reduce, as far as possible, the amount of waste that is disposed of in landfill.

Image 31.2 Waste Hierarchy as set out in the Waste Framework Directive (Source: European Commission)

The consideration of resources in the context of this assessment includes a review of the potential for beneficial reuse of materials arising from the construction of the proposed development (e.g., excavated soil and stones).

If excavated material is not required for the construction of the proposed development, the appointed contractor will screen the material for suitable end uses including other construction projects beyond the proposed development, with priority to be given to activities which are higher up the waste hierarchy. The material would then be considered as a resource for reuse beyond the proposed development insofar as is reasonably practicable and may be notified to the EPA as a by-product, as appropriate.

31.2.2 Study Area

In considering the study area for resource and waste management, it is necessary to consider the area within which resources and waste are generated, as well as those facilities which reuse, recycle, recover and / or dispose of waste.

The study area for resource and waste generation from the proposed development comprises the areas and activities within the proposed development boundary (refer to Figure 1.1 in Volume 7). The proposed development boundary consists of all infrastructure located within the array area and offshore export cable corridor (hereafter referred to as the 'offshore development area') seaward of the HWM and all onshore infrastructure located landward of the HWM (hereafter referred to as the 'onshore development area'). Refer to the Offshore Description Chapter and the Onshore Description chapter for further information on the respective development areas.

Waste from the proposed development may be accepted at sites nationally and internationally (which hold the appropriate certificate of registration, waste facility permit and / or EPA waste licence for the waste quantity and type) for treatment, recovery and / or disposal. However, as waste management planning in Ireland takes place on a regional basis, the study area generally for waste treatment, recovery and / or disposal comprises the Eastern-Midlands Waste Region (EMWR), which takes in the following 12 local authority regions (refer to Image 31.1):

- Dublin City;
- Fingal;
- South Dublin;
- Longford;
- Louth;
- Meath;

- Dún-Laoghaire Rathdown;
- Kildare;
- Laois;
- Offaly;
- Westmeath; and
- Wicklow.

Where data is available at a local authority or regional level this has been used. National data is used where this is the only available level at which statistics and data is published.

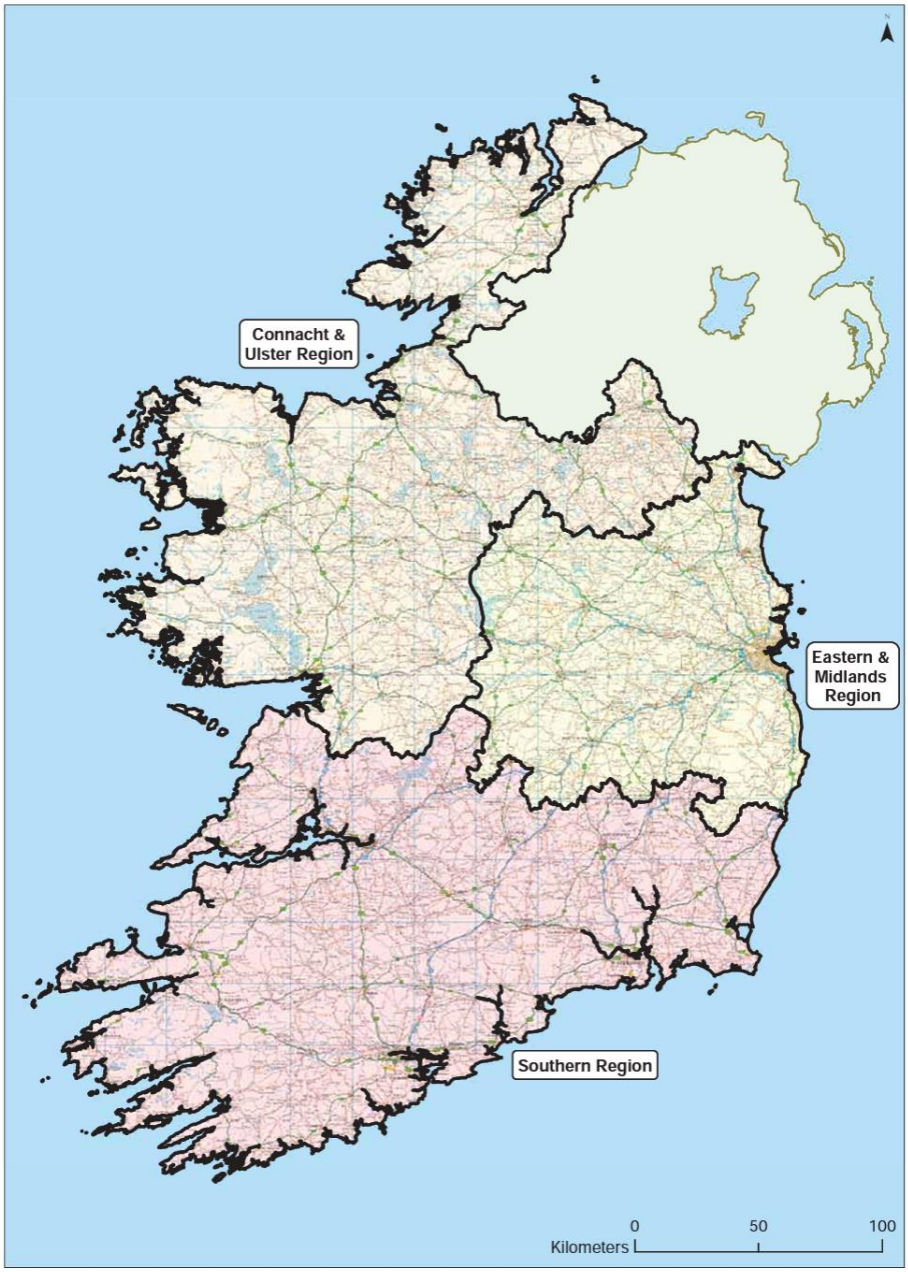

Image 31.3 Waste regions of Ireland (Source: Eastern-Midlands Waste Regional Authority, 2015)

31.2.3 Policy and Guidelines

The following policy and guidelines documents were considered when undertaking the resource and waste management assessment:

- Dublin City Council (2022). *Dublin City Development Plan 2022-2028;*
- Department of Communications, Climate Action and Environment (DCCAE) (2020). *A Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020-2025*;

- Department of the Environment, Climate and Communications (DECC) (2021). *Whole of Government Circular Economy Strategy 2022-2023;*
- DECC (2019). *Consultation on the Transposition of the Circular Economy Waste Package;*
- Eastern-Midlands Waste Regional Authority (2015). *Eastern-Midlands Region Waste Management Plan 2015-2021;*
- Environmental Protection Agency (EPA) (2023a). *Construction and Demolition Waste Statistics for Ireland*;
- EPA (2023b). *Hazardous Waste Statistics for Ireland;*
- EPA (2023c). *Municipal Waste Statistics for Ireland;*
- EPA (2023d). *Biodegradable municipal waste to landfill;*
- EPA (2022a). *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* ('the EPA Guidelines')*;*
- EPA (2021a). *Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects*;
- EPA (2021b). *Circular Economy Programme 2021-2027;*
- EPA (2020a). *By-Product – Guidance Note. A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations, 2011;*
- EPA (2020b). *Guidance to Planners, Planning Authorities and An Bord Pleanála on the Management of Excess Soil and Stone from Developments;*
- EPA (2019). *Guidance on Soil and Stone By-products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011;*
- EPA (2018). *Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-hazardous;*
- European Commission (2020). *Circular Economy Action Plan for a Cleaner and More Competitive Europe;*
- European Commission (2018). *EU Construction and Demolition Waste Management Protocol and Guidelines;*
- European Commission (2015). *Closing the Loop: An EU Action Plan for the Circular Economy;*
- Fingal County Council (2023). *Fingal County Development Plan 2023-2029;*
- Louth County Council (2021). *County Louth Development Plan 2021-2027*;
- Meath County Council (2021). *Meath County Development Plan 2021-2027;*
- The Institute of Environmental Management & Assessment (IEMA) (2020). *IEMA guide to: Materials and Waste in Environmental Impact Assessment* (the 'IEMA' Guidelines)*;*
- Regional Waste Management Planning Offices (RWMPO) (2024). *National Waste Management Plan for a Circular Economy 2024-2030;* and
- RWMPO (2020). *Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity*.

31.2.4 Legislation

This assessment has been undertaken in accordance *inter alia* with Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU ('the EIA Directive').

In addition, the following European and National legislation was considered when undertaking the resource and waste management assessment:

- Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (the 'Waste Framework Directive');
- Number 26 of 2022 – Circular Economy and Miscellaneous Provisions Act 2022;
- Number 39 of 2009 – Foreshore and Dumping at Sea (Amendment) Act 2009;
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste ('the Landfill Directive');
- Number 10 of 1996 – The Waste Management Act 1996, as amended ('the Waste Management Act');
- S.I. No. 821/2007 – Waste Management (Facility Permit and Registration) Regulations 2007, as amended;
- S.I. No. 820/2007 – Waste Management (Collection Permit) Regulations 2007, as amended;
- S.I. No. 419/2007 – Waste Management (Shipments of Waste) Regulations 2007;
- S.I. No. 86/2008 – Waste Management (Facility Permit and Registration) Regulations 2008, as amended;
- S.I. No. 126/2011 – European Communities (Waste Directive) Regulations 2011, as amended; and
- S.I. No. 323/2020 – European Union (Waste Directive) Regulations 2020 ('the Waste Directive Regulations').

A summary of key legislation, policy and guidelines is included in Volume 11, Appendix 31.1.

31.2.5 Appraisal Method for Assessment of Impacts

The potential environmental impacts of solid waste generation and resource use and management associated with the proposed development were assessed with respect to the construction, operational and decommissioning phases. These impacts may be neutral, positive or negative, and are dependent on the measures employed to prevent and / or manage the resources used and waste generated.

31.2.5.1 Assessment Methodology

The likely impacts are assessed by describing waste and by-products generation and management from the proposed development and comparing this to the current waste and by-product management baseline in Ireland. The impact assessment and waste management options have been considered with regard to the waste hierarchy and the Waste Framework Directive.

The following factors were considered when determining the significance of the impacts of the proposed development on the various aspects of the receiving environment:

- Desk study of current practices for waste and by-product management in Ireland;
- Data gathered on the types and quantities of waste and by-product generation and management from the proposed development;
- An assessment of the likely environmental impacts that may arise from the quantity of waste requiring disposal, in line with the significance criteria from the EPA Guidelines (EPA, 2022a), as illustrated in Table 2.2 in Volume 2, Chapter 2: EIA Methodology;
- An assessment of the resources required for the proposed development against regional and / or national stock levels;
- The surplus materials arising and waste infrastructure capacity in the EMWR in which the proposed development is located; and

- A review of the likely significant effects associated with the proposed development in the context of the waste hierarchy and circular economy principles (see Section 31.2.7) to inform any potential mitigation measures, should they be required.

31.2.5.2 Significance Criteria

The criteria used to categorise resource and waste impacts is based on the EPA guidelines (EPA, 2022a) as illustrated in Table 2.2 in Volume 2, Chapter 2: EIA Methodology. The EPA significance impact ratings are used to describe the impacts arising from the construction, operation and decommissioning of the proposed development.

The Institute for Environmental Management and Assessment (IEMA) released guidelines in 2020 setting out a standard approach to undertaking waste assessments for EIA (IEMA, 2020). For the onshore elements of the waste impact assessment only, the EPA guidelines are also complemented by the more detailed approach set out in the IEMA guidelines.

The IEMA guidelines set out that the receptor for waste relates to the availability of regional (and where appropriate, national) landfill void capacity baseline. The availability and capacity of non-landfill waste management infrastructure (in conjunction with any identified trends) may be used to provide a more comprehensive context for assessing the magnitude of impacts.

As set out in Section 3.1.3, Ireland's construction and demolition waste is predominately managed through backfilling material (85%) and only 7% is managed through disposal routes (EPA 2023a). Therefore, in conjunction with identified trends nationally and in the region, it is considered appropriate to use regional authorised waste management infrastructure (for reuse, recycling, recovery and / or disposal) intake capacity as the receptor, as set out in Table 31.1 and Section 31.3.1.2.

The EPA guidelines are complemented by the IEMA guidelines in order establish the waste management significance criteria for the waste assessment for the onshore elements of the waste impact assessment only, as presented in Table 31.1.

Table 31.1 Significance criteria based on EPA guidelines and IEMA guidelines for significance of effect for inert and non-hazardous waste (onshore waste impact assessment)

Imperceptible	Not significant	Slight	Moderate	Significant	Very Significant	Profound
Zero waste generation and requirement for reuse, recycling, recovery and / or disposal from the proposed development	Waste generated by the proposed development will reduce regional authorised waste management infrastructure (for reuse, recycling, recovery and / or disposal) intake capacity by <1%	Waste generated by the proposed development will reduce regional authorised waste management infrastructure (for reuse, recycling, recovery and / or disposal) intake capacity by 1-5%	Waste generated by the proposed development will reduce regional authorised waste management infrastructure (for reuse, recycling, recovery and / or disposal) intake capacity by 6-10%	Waste generated by the proposed development will reduce regional authorised waste management infrastructure (for reuse, recycling, recovery and / or disposal) intake capacity by >10%	Waste generated by the proposed development will reduce regional authorised waste management infrastructure (for reuse, recycling, recovery and / or disposal) intake capacity by >10% and will significantly alter most of a sensitive aspect of the environment	Waste generated by the proposed development will reduce regional authorised waste management infrastructure (for reuse, recycling, recovery and / or disposal) intake capacity by >10% and will obliterate sensitive characteristics

Data is available to inform the onshore waste impact assessment in line with the IEMA guidelines.

For the offshore waste impact assessment, offshore resource impact assessment and onshore resource impact assessment, limited data is available. Furthermore, no relevant guidelines are currently available to inform the impact assessment for offshore activities. Therefore, the EPA significance ratings are used to describe the impacts arising for the offshore waste impact assessment, offshore resource impact assessment and onshore resource impact assessment.

31.2.5.3 Parameters for Assessment – Offshore

The identification of potential impacts from the offshore infrastructure on receptors has been undertaken by comparing the relevant characteristics relating to resource and waste management of two project options (Project Option 1 and Project Option 2 – refer to Section 6.2 of the Offshore Description Chapter for further details).

The assessment considers the Project Option which will cause the greatest magnitude of resource impact to form the basis for the offshore resource assessment in this chapter as it has the greatest likelihood to generate a potential significant effect. Similarly, the Project Option that will cause the greatest magnitude of waste generation impact has formed the basis for the offshore waste generation assessment in this chapter as it has the greatest likelihood to generate a likely significant effect.

Refer to Section 31.4.4 for further details and a detailed comparison of the relevant characteristics relating to resource and waste management for Project Option 1 and Project Option 2.

31.2.5.4 Parameters for Assessment – Onshore

The identification of potential impacts from an onshore perspective has been undertaken by considering the scenario with the greatest magnitude of resource and waste management impact, as defined by the scenario which requires the greatest quantity of resources and generates the greatest quantity of waste.

31.2.6 Data Collection and Collation

A desk study was undertaken which comprised the following tasks:

- Review of relevant legislation and policy which creates the legal framework for resource and waste management in Ireland;
- Review of estimated surplus materials and by-product generation from the construction phase of the proposed development;
- Review of operational phase waste;
- Review of decommissioning phase waste;
- Review of the proposed development design during development of the EIAR to identify appropriate mitigation and move waste management up the waste hierarchy through implementation of best practice, where possible (refer to Section 31.6);

Review of types, quantities and management of Construction and Demolition (C&D) waste arisings generated in Ireland, in the relevant local authority jurisdictions and in the EMWR;

- Review of types, quantities and management of municipal waste arisings generated in Ireland;
- Review of types, quantities and management of hazardous waste arisings generated in Ireland; and
- Review of availability (type and capacity) of waste infrastructure within each of the local authority jurisdictions through which the proposed development will pass and in the EMWR.

31.2.7 Waste Management Principles

The following principles of the waste hierarchy (refer to Image 31.3), in line with the Waste Framework Directive, will be taken cognisance of by the appointed contractor during the construction phase of the proposed development.

31.2.7.1 Prevention and Minimisation

Waste prevention and minimisation are the most environmentally sustainable means of managing surplus materials. The principles of prevention and minimisation of waste are inherent in the design of the proposed development, including, for example, consideration of the use of sustainable construction materials and the re-use of excavated materials, where possible.

31.2.7.2 Reuse

Regulation 27 of the European Union (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011), as amended (Regulation 27) allows a material producer to declare, under certain circumstances, that a material is a by-product and not a waste. Substances or objects, such as soil and stones produced during construction projects, can be determined as a by-product if they satisfy all of the following criteria:

- Further use of the material is certain;
- The material can be used directly without any further processing other than normal industrial practice;
- The material is produced as an integral part of the production process; and
- Further use is lawful, in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Substances or objects will be a by-product if they meet each of the conditions detailed in Regulation 27. The baseline area for reuse of by-products in accordance with Regulation 27 comprises the whole country as no regional distinction is made in the Regulation 27 register.

Where it is proposed to notify the EPA in relation to excavation material from the proposed development, the appointed contractor will be responsible for ensuring compliance with Regulation 27 of the European Union (Waste Directive) Regulations 2011, as amended, including notification to the EPA, seeking a determination from the EPA on the matter and compliance with all relevant EPA guidance on the matter.

Where it is proposed to use soil from off-site which is a by-product and subject to Regulation 27 of the European Union (Waste Directive) Regulations 2011, as amended, the appointed contractor is responsible for carrying out any necessary due diligence regarding the material and ensuring that all EPA guidelines relating to that Regulation 27 notification have been complied with before the soil is imported into the site. Where feasible, appropriate and available, construction by-products arising from other sites will be used in the development of this site in place of virgin materials.

31.2.7.3 Recycling, Recovery and Disposal

Where surplus materials are generated that cannot be reused, these will be regarded as waste and will be delivered to recycling, recovery or disposal facilities authorised in accordance with the Waste Management Act, 1996, as amended, which hold a certificate of registration, waste facility permit and / or EPA waste licence.

All wastes removed from site will be transported by the holder of an appropriate waste collection permit, granted in accordance with the S.I. No. 820/2007 – Waste Management (Collection Permit) Regulations 2007, as amended.

The option of disposal is the least desirable outcome for surplus material generated by the proposed development and will only be considered where it is not possible to deliver wastes for recycling or recovery to appropriately permitted / licensed facilities for reuse / recycling purposes.

In addition, where waste facility capacity does not exist within Ireland for management of specific waste streams, such as hazardous soils, these will be transported by the holder of an appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 – Waste Management (Collection Permit) Regulations 2007, as amended, and subsequently exported for treatment, recovery or disposal in accordance with the provisions of S.I. No. 419/2007 – Waste Management (Shipments of Waste) Regulations 2007, and in accordance with current practice in Ireland.

It will be the responsibility of the appointed contractor, under the Waste Management Act 1996, as amended, and as detailed in the CRWMP (which is included within the Onshore CEMP in Volume 8, Appendix 9.1) to ensure that all material delivered to authorised waste facilities is correctly classified and will meet the waste acceptance criteria of the receiving site. Offshore spoil management principles are presented in the Offshore Environmental Management Plan (EMP) in Volume 8, Appendix 6.1.

It will be the responsibility of the appointed Contractor to secure agreements for reuse, recycling or disposal of surplus materials from the proposed development in construction projects or authorised facilities, where appropriate, in accordance with the Waste Management Act 1996, as amended, and associated regulations.

Where feasible, recycled components or materials will be used in the proposed development in place of virgin materials. The use of recycled components or materials are subject to the provisions of the Waste Management Act 1996, as amended, and Regulation 28 of the European Union (Waste Directive) Regulations 2011 (as amended).

31.3 Baseline Environment

31.3.1 Construction Waste

31.3.1.1 National

List of Waste (LoW) codes for typical C&D wastes are included in Volume 11, Appendix 31.2. The LoW codes provide context as to the main C&D wastes likely to arise from activities within both the offshore development area and the onshore development area (see Section 31.4).

In 2021, the latest year for which there are published statistics available, 9 million tonnes of C&D waste were generated in Ireland, representing an increase of 800,000 tonnes from 2020 (EPA, 2023a). Of this waste, approximately 7.7 million tonnes comprised of soil and stones, making up approximately 85% of the material waste stream.

A breakdown of the composition of C&D waste in Ireland in 2021 is set out in Table 31.2. These figures should be considered as a guide only, as C&D waste can vary significantly from one project to another, depending on the nature of the development and the waste management practices employed on site.

Table 31.2 C&D waste composition in 2021 (EPA, 2023a)

Waste materials from C&D Sources	Quantity (tonnes)	Proportion of material stream (%)
Soils stone and dredging spoil	7,696,287	85.1%
Concrete, bricks, tile and gypsum	608,235	6.7%
Mixed C&D waste	362,380	4.0%
Metal	257,558	2.8%
Bituminous mixtures	87,343	1.0%
Segregated wood, glass and plastic	31,946	0.4%
Total	**9,043,749**	**100%**

Data issued by the EPA demonstrates that final treatment operations (backfilling, recycling, energy recovery, disposal) of C&D waste materials varied greatly between material streams. 85% of C&D waste was used for backfilling (a recovery operation), which mainly reflects the dominance of soil and stones in the overall composition mix.

The EPA reports that Ireland achieved 85% material recovery of C&D waste in 2021 (EPA, 2023a). Under the Waste Framework Directive Member States must achieve 70% of material recovery of non-hazardous, non-soil-and-stone C&D waste by 2020.

National authorised capacity statistics for soil recovery facilities are presented in the National Waste Management Plan for a Circular Economy 2024-2030 (RWMPO, 2024). Table 31.3 outlines the national breakdown of all soil recovery facilities in Ireland in 2021. Table 31.4 outlines the existing capacity of operational facilities accepting inert waste throughout Ireland.

Table 31.3 Soil recovery facilities in Ireland 2021 (RWMPO, 2024)

Type of authorisation	No. of facilities	Available treatment capacity for soil waste	Soil waste accepted in 2020 (tonnes)	Remaining available treatment capacity for soil waste from 2022 (tonnes)
Licenced	16	4,746,400 (annual)	2,773,687	25,272,206 (lifetime)
Permitted	230	9,939,156 (lifetime)	2,436,586	6,686,156 (lifetime)
Registered	228	3,598,291 (lifetime)	578,470	906,948 (lifetime)
Total	**474**	-	**5,788,746**	**32,865,310**

Table 31.4 Operational facilities accepting inert waste in Ireland (RWMPO, 2024)

Facility	Location	Annual licenced capacity (tonnes)	Accepted 2019 (tonnes)	Accepted 2020 (tonnes)	Accepted 2021 (tonnes)	Accepted 2022 (tonnes)
Integrated Materials Solution (W0129-02)	Dublin	500,000	420,392	487,131	421,520	324,083
Walshestown Restoration Ltd. (W0254-01)	Kildare	330,000	229,650	283,986	329,572	271,743
Kyletalesha Landfill (W0026-03)	Laois	47,100	25,085	28,597	2,218	71,554
Boliden Tara Mines Limited (P0516-04)	Meath	-	509,235	417,573	15,555	334,632
Total (excluding Tara Mines)		**877,100**	**675,127**	**799,714**	**753,310**	**667,380**
Total (including Tara Mines)		**N/A**	**1,184,362**	**1,217,286**	**768,865**	**1,002,012**

Regulation 27 of the European Union (Waste Directive) Regulations 2011, as amended, allows a material producer to determine, under prescribed circumstances, that a material is a by-product and not a waste and so can be reused onsite or offsite within the industry.

On receipt of Regulation 27 notifications to the EPA, materials can be determined as a waste or a by-product. In some cases, no determination has been issued by the EPA, meaning the material has not been determined as a waste. In 2021, the EPA received by-product notifications for approximately 12.5 million tonnes of soil and stones material (EPA, 2023a). The EPA determined that 459,836 tonnes of the soil and stone notified were by-product, as notified, and 600 tonnes were waste. Notifications for 152,400 tonnes were withdrawn. The estimated quantity of soil and stone material notified in 2021 for which no determination was made was approximately 11.9 million tonnes.

The EPA reports that a total of 466,941 tonnes of hazardous waste was generated in Ireland in 2021, representing a decrease of over 90,000 tonnes (or 16%) since 2020 (EPA, 2023b). Hazardous waste types include wastes from dredging spoil, contaminated soils, waste treatment, solvents and hazardous elements of waste electrical and electronic equipment. The EPA notes that 2021 is the first year that Ireland treated a higher percentage of hazardous waste (52%) than was exported for treatment.

31.3.1.2 Regional

The Regional Waste Management Planning Offices (RWMPO) published a Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity Report in 2020 (RWMPO, 2020) which states that:

"Licenced capacity is most prominent in the EMWR which has a healthy supply of active capacity and substantial new capacity due to come on stream. The Region contains 80% of the national capacity."

A summary of the facilities with a certificate of registration and the corresponding capacity for the EMWR, at the end of 2018, is presented in Table 31.5. A summary of the facilities with a waste facility permit and the corresponding capacity in the EMWR, at the end of 2018, is presented in Table 31.6. A summary of the facilities with a waste licence and the corresponding capacity in the EMWR, at the end of 2018, is presented in Table 31.7.

Table 31.5 Summary of EMWR waste capacity – facilities with certificate of registration (2018) (RWMPO, 2020)

No. facilities	Permitted capacity (lifetime) (tonnes)	Intake 2018 (tonnes)	Remaining capacity (lifetime) (tonnes)
43	394,934	102,724	188,288

Table 31.6 Summary of EMWR waste capacity – facilities with waste facility permit (2018) (RWMPO, 2020)

No. facilities	Permitted capacity (lifetime) (tonnes)	Intake 2018 (tonnes)	Remaining capacity (lifetime) (tonnes)
49	2,665,197	546,012	1,333,523

Table 31.7 Summary of EMWR waste capacity – facilities with waste licence (2018) (RWMPO, 2020)

No. facilities	Annual capacity (application stage) (tonnes)	Annual capacity (licenced, un-commenced) (tonnes)	Annual capacity (active and available) (tonnes)
15	1,272,833	1,540,000	2,411,400

31.3.2 Resource Use

Resources will be required to be imported for the construction phase of the proposed development, and to a lesser extent, for the operational phase of the proposed development.

A report entitled Essential Aggregates: Providing for Ireland's Needs to 2040 (Irish Concrete Federation, 2019) was published in 2019 which details and quantifies Ireland's natural aggregate reserves. At the time of publication of that report, Ireland had approximately 500 active large commercial quarries, approximately 220 ready mixed concrete plants, 20 large scale precast concrete plants and 40 plants producing bitumen bound road surfacing materials.

The Irish Concrete Federation quantifies the annual production of these materials in Ireland on their website (Irish Concrete Federation, 2024), with the 2022 figures (the most recent available) being as follows:

- Five million cubic metres of ready-mixed concrete;
- 135 million concrete blocks;
- 38 million tonnes of aggregates;
- Two million tonnes of bituminous road surfacing materials; and
- Two million square metres of paving products.

It is acknowledged that additional resources, (e.g., steel, fibreglass, resin, plastic, iron or cast iron, copper, aluminium and metals) will be required during the construction and operational phase of the proposed development. However, national data / statistics is not presently available on the annual production of these materials in Ireland.

31.3.3 Municipal Waste

Municipal waste will be generated in small quantities during the construction, operational and decommissioning phases of the proposed development. Municipal waste in Ireland is made up of household waste as well as commercial and other waste that, because of its nature of composition, is similar to household waste. According to the EPA, Ireland generated 3.17 million tonnes of municipal waste in 2021 (EPA, 2023c).

Of the 3.17 million tonnes of municipal waste generated in Ireland in 2021, 41% was used in energy recovery, 26% was used in material recycling, 16% was landfilled, 15% was used in composting / anaerobic digestion and 1% was unmanaged. Of the 3.17 million tonnes of municipal waste, 57% is estimated to be from households and 43% is estimated to be from commercial and public service sources.

Since 2001, significant changes have occurred in the management of municipal waste in Ireland, notably the dramatic decline in landfilling over this period, accompanied by increased levels of recycling in the early 2000s and subsequently an increase in the share of municipal waste sent for energy recovery since 2011.

Biodegradable municipal waste (BMW) comprises those elements of the municipal waste stream that will degrade biologically, for example food waste, garden and parks waste, wastepaper and cardboard. Under the Landfill Directive, Ireland is committed to meeting targets for the diversion of BMW from disposal to landfill. The quantity of BMW disposed to landfill in 2022 was 129,572 tonnes (EPA, 2023d).

Capacity from composting and anaerobic digestion, municipal waste landfill, Material Recovery Facilities (MRFs), integrated waste management facilities, municipal waste incinerators and cement kilns accepting wastes for co-incineration can all be used to treat municipal waste.

31.4 Characteristics of the Proposed Development

This section outlines the characteristics of the proposed development that are relevant to the identification and assessment of effects on resource and waste management during each phase of the project. The use of resources and the generation of waste from both the offshore infrastructure and the onshore infrastructure is considered.

Further details relating to the offshore infrastructure of the proposed development is provided in the Offshore Description Chapter and the Offshore Construction Chapter, while further details relating to the onshore infrastructure of the proposed development is provided in the Onshore Description Chapter and the Onshore Construction Chapter.

31.4.1 Construction Phase

31.4.1.1 Offshore

Aspects considered in the assessment of resource use and waste management from the offshore infrastructure during the construction phase included the following:

- Offshore seabed preparation – including waste generated from unexploded ordnance (UXO) clearance, boulder clearance and sand wave clearance;
- Offshore installation – including waste generated from the excavation of subsea sediment during the construction of the WTG and Offshore Substation Platform (OSP) foundations, and during the cable installation works;
- Offshore resource use – including the import and use of resources for the construction of new infrastructure, such as the subsea electrical cables, foundations, scour protection, WTGs and OSP;
- Offshore general construction waste – including waste generated from and in relation to the construction of new infrastructure, such as grouting and surplus cabling segments; and

Offshore municipal waste – including the generation of municipal waste materials by construction workers on vessels.

31.4.1.2 Onshore

Aspects considered in the assessment of resource use and waste management from the onshore infrastructure during the construction phase included the following:

- Onshore site clearance – including waste generated from the removal of vegetation and fencing;
- Onshore excavation – including waste generated from the excavation of below ground material such as soil and stones at the landfall site, the grid facility and throughout the entirety of the onshore cable route from the landfall site to the connection point at the existing Belcamp substation and its planned expansion;

- Onshore resource use – including the import and use of resources for the construction of new infrastructure, such as the onshore cables, foundations, grid facility, permanent access tracks and road paving;
- Onshore general construction waste – including waste generated from and in relation to the construction of new infrastructure / buildings; and
- Onshore municipal waste – including the generation of municipal waste materials by construction workers from, for example, site offices and welfare facilities.

31.4.2 Operational Phase

Aspects considered in the assessment of resource use and waste management from the proposed development during the operational phase included the following:

- Waste generated from maintenance activities related to the OSP, WTGs, inter-array, offshore export cable and onshore grid facility;
- Resource use – including the import and use of resources for maintenance activities related to the OSP, WTGs, inter-array, offshore export cable and onshore grid facility; and
- Municipal waste generated from workers completing maintenance activities during the operational phase.

31.4.3 Decommissioning Phase

Aspects considered in the assessment of resource use and waste management from the proposed development during the decommissioning phase included the following:

- Waste generated from the decommissioning of offshore infrastructure, such as the OSP, WTGs and foundations; and
- Waste generated from the decommissioning of onshore infrastructure / buildings, such as the compensation substation within the grid facility.

31.4.4 Offshore Assessment

As noted in Section 31.2.5.3, the relevant characteristics relating to resource and waste management of two Project Options (Project Option 1 and Project Option 2) have been compared. The relevant characteristics relating to resource and waste management for the construction of Project Option 1 and Project Option 2 are presented in Table 31.8.

As identified in Table 31.8, Project Option 1 represents the option that will cause the greatest magnitude of resource use impact during the construction phase. Project Option 2 will have an equal or lower magnitude of resource use impact during the construction phase.

Project Option 2 represents the option that will cause the greatest magnitude of waste generation impact during the construction phase. Project Option 1 will have an equal or lower magnitude of waste generation impact during the construction phase.

It should be noted that the comparison in Table 31.8 has been made for the construction phase only as the construction phase is when the majority of potential impacts will arise. As Project Option 1 formed the basis for the offshore resource use assessment for construction (and has the larger quantity of resources requiring maintenance and decommissioning when compared to Project Option 2), this option is also likely to generate the greatest magnitude of resource and waste impact during the operational and decommissioning phases. Project Option 2 will have an equal or lower magnitude of resource and waste impact during the operational and decommissioning phases.

Table 31.8 Project Option Assessment. The Project Option that has the greatest magnitude of impact is identified in blue.

Parameter	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest magnitude of impact
Resource use			
WTG materials	Steel: 73,500 tonnes Fiberglass, resin or plastic: 11,025 tonnes Iron or cast iron: 7,840 tonnes Copper: 1,470 tonnes	Steel: 70,000 tonnes Fiberglass, resin or plastic: 9,625 tonnes Iron or cast iron: 8,750 tonnes Copper: 1,470 tonnes	Project 1 represents the Project Option with the greatest magnitude of impact associated with resource use for the WTG materials. The greatest likely significant effect for WTG construction results from the greater quantity of material required for Project Option 1.
WTG foundations – jacket foundations	Jacket foundations are not considered for Project Option 1	Primary steel – 125,000 tonnes Concrete – 0 Grouting – 15,750m^3 Secondary steel – 100 tonnes Galvanic anode cathodic protection (GACP) anodes (zinc or aluminium) – 12 tonnes Scour protection (rocks) – 169,980m^2	Project Option 1 represents the Project Option with the greatest magnitude of impact associated with resource use for the WTG foundations. The greatest likely significant effect for foundation installation results from the greater quantities of steel required for monopile foundations for Project Option 1. Whilst there is a greater volume of rocks required for scour protection for Project Option 2, the difference does not negate the greater steel demand due to the natural occurrence and local availability of rocks for scour protection.
WTG foundations – monopile foundations	Primary steel – 130,000 tonnes Concrete – 0 Grouting – 13,760m^3 Secondary Steel – 115 tonnes Galvanic anode cathodic protection (GACP) anodes (zinc or aluminium) – 12 tonnes Scour protection (rocks) – 67,649m^2	Primary steel – 120,000 tonnes Concrete – 0 Grouting – 10,300m^3 Secondary steel – 115 tonnes Galvanic anode cathodic protection (GACP) anodes (zinc or aluminium) – 12 tonnes Scour protection (rocks) – 52,616m^2	
Offshore substation platform (OSP) – topside	Steel: 1,000 tonnes Copper: 150 tonnes Transformer oil: 200 tonnes	Steel: 1,000 tonnes Copper: 150 tonnes Transformer oil: 200 tonnes	Jacket foundations on pin piles represent the greatest magnitude of impact associated with resource use for the OSP.

Parameter	Project Option 1 (49 WTG)	Project Option 2 (35 WTG)	Rationale for the project option with the greatest magnitude of impact
Offshore substation platform (OSP) – jacket foundations on pin piles	Steel: 3,000 tonnes Concrete: 0 Grouting: 200m^3	Steel: 3,000 tonnes Concrete: 0 Grouting: 200m^3	The design of the OSP is consistent across both Project Options. Therefore, there is no difference in impacts between the two. However, of the foundation options considered, jacket foundations have the greater magnitude of impact due to the increased quantity of materials required for construction.
Offshore substation platform (OSP) – monopile foundations	Steel: 2,500 tonnes Concrete: 0 Grouting: 0	Steel: 2,500 tonnes Concrete: 0 Grouting: 0	
Subsea electrical cables	Subsea inter-array cables: 111km Export cables: 36km Subsea inter-array cable protection: 138,400m^3 Export cable protection: 43,200m^3 Subsea electrical cables will comprise a variety of materials, such as copper, aluminium, plastic and composite materials.	Subsea inter-array cables: 91km Export cables: 36km Subsea inter-array cable protection: 114,400m^3 Export cable protection: 42,200m^3 Subsea electrical cables will comprise a variety of materials, such as copper, aluminium, plastic and composite materials.	Project Option 1 represents the Project Option with the greatest magnitude of impact associated with resource use for the subsea electrical cables. The greatest likely significant effect for inter-array cabling results from the greater quantities of cables required for Project Option 1. The approximate length of export cabling required is the same across both Project Options.
Waste generated			
Material generated during preparatory dredging	There are no impacts associated with Project Option 1.	Project Option 2 (jackets): 130,040m^3	Project Option 2 represents the Project Option with the greatest magnitude of impact associated with waste material generated during preparatory dredging and from the drill cuttings. The material generated during the construction of Project Option 2 with an OSP with a jacket foundation has the potential to be greater than the material generated in Project Option 1. However, as noted in Section 31.5.2.2, the treatment method proposed for the material generated in Project Option 2 is unlikely to create any significant effects.
Drill cuttings	Monopile foundations: 338,243m^3	Monopile foundations: 322,136m^3 Jackets foundations: 356,257m^3	

31.5 Potential Effects

This section presents the likely significant effects that may occur due to the proposed development, in the absence of mitigation. This informs the need for mitigation or monitoring to be proposed should this be required (refer to Section 31.6). Residual effects taking into account any proposed mitigation is then presented in Section 3.17.

31.5.1 'Do-Nothing' Scenario

In the scenario where the proposed development does not proceed, the resource and waste management effects described in this chapter would not arise. The resource and waste impact would be neutral.

31.5.2 Offshore Construction Phase

31.5.2.1 Offshore Seabed Preparation

The preferred method of constructing the offshore infrastructure for the proposed development will be the routing / location of structures or cables around obstacles along the seabed where possible. However, UXO clearance or boulder clearance may be required in some instances where this is not technically feasible.

When a target has been identified as a potential UXO, it may be detonated in situ and any remaining debris removed. Where a target is confirmed as non-UXO, it may be recovered for onshore disposal where practicable.

For the inter-array cables, it is anticipated that a 15m wide corridor will be designated for boulder clearance activities per cable. For the offshore export cables, a 30m wide clearance corridor per cable will be designated. As noted in Section 8.3.2 of the Offshore Construction Chapter, boulders greater than 0.5m in diameter will need to be moved aside.

In addition, a Pre-Lay Grapnel Run will be undertaken prior to cable installation which will identify any obstacles or debris within the intended footprint of any offshore cables. Any obstacles or debris (e.g. rocks) that could obstruct cable installation will be relocated on the seabed or recovered onto deck, where possible. Approximately 490 boulders have been located within the offshore development area in Project Option 1 which will be cleared (compared to 350 in Project Option 2).

The geophysical survey data available presently suggests a relatively featureless seabed across the proposed development area and therefore sand wave clearance is not considered part of the construction strategy. However, pre-construction surveys may identify sediment bedforms which may require levelling prior to cable installation, using a process such as controlled / mass flow excavation.

Offshore seabed preparation works, including potential UXO, boulder and sand wave clearance, will, for the most part, result in materials being left either in situ or to disperse naturally. However, minor quantities of waste material (e.g., non-UXO) may be recovered onto deck before being transferred onshore for recycling, recovery or disposal at an authorised waste facility.

The nature of the seabed preparation will generate minor quantities of C&D waste that will require disposal. Section 31.3 notes that there is a substantial available treatment capacity for the waste generated. Therefore, the potential impact of the offshore seabed preparation works, in the absence of mitigation, is negative and slight for both project options, which is not significant in EIA terms.

31.5.2.2 Offshore Installation

Excavation of subsea sediment will be required during the construction of the WTG and OSP foundations and during the cable installation works.

The Offshore Construction Chapter notes that the proposed approach for disposal of drill cuttings is not to remove them from the local environment. The drill cuttings arising from the construction of the WTG and OSP foundations will be removed from site to the pile installation vessel before being subsequently discharged to sea within the offshore development area. It is anticipated that finer sediments will disperse naturally into the water column, while coarser sediments will settle back into the seabed.

A Dumping at Sea (DaS) licence is required by the EPA for these activities and will be sought by the Developer ahead of construction commencing.

The estimated volume of material generated during the preparatory dredging works and during the drill cutting works for the foundations for the proposed development is presented in Table 31.8.

Export and inter-array cables are likely to be buried using a combination of techniques including trenching, jetting and ploughing. The burial depth will ensure that the cable is adequately protected against scour and damage from activities such as trawling, anchoring etc. No spoil material is anticipated to require management from the installation of the export and inter-array cables. The arisings are expected to be side cast or lost due to dispersal.

An offshore waste management plan is included in the Offshore Environmental Management Plan (Offshore EMP) (Volume 8, Appendix 6.1) which includes details on the management of subsea sediment.

The material generated from the preparatory dredging works and the drill cutting works will be distributed evenly across the array area, which represents an area of 89km^2. As Ireland's seabed territory covers an area of approximately 880,000km^2 (Marine Institute, 2022), this represents a very small area of impact. Historic offshore ground investigation results indicate that no hazardous material will be generated from the preparatory dredging works and the drill cutting works.

A DaS licence is required by the EPA for the offshore installation works and will be sought by the Developer ahead of construction commencing. This licence will provide further detailed information related to the classification of the material that will be generated.

Potential impacts on marine geology, oceanography and physical processes as a result of the proposed offshore installation works are detailed in Volume 3, Chapter 10: Marine Geology, Oceanography and Physical Processes, while potential impacts on marine water and sediment quality as a result of the proposed offshore installation works are detailed in Volume 3, Chapter 11: Marine Water and Sediment Quality.

The potential effect of the offshore installation works therefore, in the absence of mitigation, is negative and slight for both Project Options, which is not significant in EIA terms.

31.5.2.3 Offshore Resource Use

Within the array area, subsea inter-array and export cables will be required to export generated electricity to land. To connect the WTGs to the OSP, it is estimated that approximately 111km of inter-array offshore cables will be required. A further estimate of approximately 18km of export cabling (two offshore export cables representing a total cable length of approximately 36km) will be required to connect the OSP to the landfall site. These subsea cables will comprise a variety of materials, such as copper, aluminium, plastic and composite materials.

The foundation types that are being considered for the WTGs are monopile foundations and jacket foundations (jacket foundations are only considered for Project Option 2). The foundation types considered for the OSP are a single monopile, a double monopile configuration or a jacket foundation with piles. In each foundation type, steel will be required. For jacket foundations, grout is required to secure the jacket substructure to the pile foundation as described in Section 8.3.3 of the Offshore Construction Chapter.

Additionally, scour protection will be required to prevent erosion of the seabed around the offshore infrastructure. The preferred solution may comprise a rock armour layer laid on a filter layer of smaller graded rocks. Refer to Section 8.3 of the Offshore Construction Chapter for further information on scour protection.

The estimated quantities of materials required for the WTG foundations are described in Table 31.8. The estimated quantity of scour protection required for WTG foundations is also provided in Table 31.8.

The WTG models considered for the proposed development follow the traditional offshore wind turbine design with three blades and a horizontal rotor axis. Each WTG will comprise a variety of materials, such as steel, fibreglass, plastic and iron – refer to Table 31.8 for further details. As noted in Table 31.8, the WTG for Project Option 1 requires the greatest quantity of materials and is considered in this assessment.

One OSP design will be used for the proposed development. However, detailed design will determine whether the foundations for the OSP will require a single monopile, two monopiles or jacket foundations. The quantities of materials required for all designs are presented in Table 31.8, with jacket foundations requiring the greatest volume of resources.

Where cable burial is not possible, additional cable protection techniques will be used such as mattressing and / or rock bags. Section 8.3.10 of the Offshore Construction Chapter notes that approximately 20% of cable length may require external protection via either rock placement or concrete mattress placement. The total volume of resources required for external cable protection is estimated to be 138,400m^3 for the inter-array cables for Project Option 1 and 43,200m^3 for the export cables for both project options.

Importation of material to the proposed development site will be carried out throughout the construction phase, with different materials being required at different times. The main direct impacts associated with the importation of construction materials arise from the gathering / manufacture of the materials, and that once the materials are used within the proposed development, they are no longer available for other uses.

Due to the specialist design of WTGs and the lack of a native supply chain for offshore wind in Ireland, these materials will be sourced internationally. Other materials including subsea inter-array and export cables will be sourced both nationally and internationally. Steel, concrete, grouting and rocks used in the construction and installation of the offshore foundations will be sourced locally and nationally, with a ready supply available.

The potential impact associated with offshore resource use, in the absence of mitigation, is negative and slight, which is not significant in EIA terms.

31.5.2.4 Offshore General Construction Waste

General construction waste is waste which arises from construction activities, including surplus and damaged products and materials arising during construction work or used temporarily during the course of on-site activities. The management of offshore general construction waste is outlined in the waste management plan within the Offshore EMP (Volume 8, Appendix 6.1).

In the case of construction of the offshore elements of the proposed development, the most likely type of general construction waste will be grouting from foundation construction and surplus cabling segments which will arise on site. As the majority of components for the construction of the offshore infrastructure will be prefabricated prior to arriving on site, the quantity of offshore general construction waste generated during the construction phase is estimated to be small. Segregation facilities will be provided on all vessels, to ensure that opportunities for the recovery and recycling of such waste are maximised.

Considering the minor quantities of offshore general construction waste that will be generated during the construction phase, the potential impact of offshore general construction waste during the construction phase, in the absence of mitigation, is negative and slight for both Project Options, which is not significant in EIA terms.

31.5.2.5 Offshore Municipal Waste

Minor quantities of municipal waste will be generated by construction workers during the construction phase (e.g., from vessels). Vessels will operate in accordance with the requirements outlined in Annexes IV and V of the International Convention for the Prevention of Pollution from Ships (the MARPOL Convention). Segregation facilities will be provided on all vessels, to ensure that recovery and recycling of such waste is maximised.

Considering the minor quantities of offshore municipal waste that will be generated during the construction phase, the potential impact of offshore municipal waste during the construction phase, in the absence of mitigation, is negative and not significant for both Project Options, which is not significant in EIA terms.

31.5.2.6 Summary of Offshore Construction Phase Effects

A summary of the potential (pre-mitigation and monitoring) effects during the construction phase of the offshore elements of the proposed development is set out in Table 31.9 and is relevant for both project options.

Table 31.9 Summary of potential offshore construction phase effects (pre-mitigation and monitoring)

Assessment Topic	Potential Effect
Offshore seabed preparation	Negative, slight
Offshore installation	Negative, slight
Offshore resource use	Negative, slight
Offshore general construction waste	Negative, slight
Offshore municipal waste	Negative, not significant

31.5.3 Onshore Construction Phase

31.5.3.1 Onshore Site Clearance

The appointed contractor will be required to carry out site clearance works from several onshore working areas throughout the proposed development site prior to the commencement of construction. Site clearance works will be required at the landfall site, along the onshore cable route, at the grid facility, along temporary access routes and at contractor compounds.

Site clearance works will include the removal of trees, hedgerows and fences. Vegetation clearance will be kept to the minimum required to facilitate construction. Subject to agreement with landowners, as required, existing vegetation, hedgerows and / or fences will be reinstated as close as possible to their original condition, on completion of the works, with appropriate materials. Site clearance works will result in the generation of minor quantities of C&D waste material (from fences) and organic waste material.

Segregation facilities will be provided for C&D waste materials, where necessary, and if not suitable for reuse, these materials will be removed by a waste collection permit holder and delivered to an authorised recycling, recovery or disposal facility. The least preferable option is disposal and this will only be considered by the appointed contractor when reasonable opportunities for reuse, recycling and recovery are unavailable. All organic waste (such as trees and vegetation) requiring removal from site will be removed by a waste collection permit holder and delivered to an authorised composting or organic waste facility.

Considering the minor quantities of C&D and organic waste that will be generated during the site clearance works, the significance criteria presented in Table 31.1 and the available treatment capacity for the waste generated (refer to Section 31.3.1), the potential impact of the onshore site clearance works, in the absence of mitigation, is negative, not significant and short-term, which is not significant in EIA terms.

31.5.3.2 Onshore Excavation

Excavation will be required at the landfall site, the grid facility and throughout the onshore cable route. The most environmentally sustainable means of managing excavated material is its prevention and minimisation which are embedded in the design of the proposed development. Excavated material generated as part of the construction works for the onshore infrastructure will generally consist of:

- Topsoil and subsoil;
- Engineered fill material (crushed stone, sand, etc.);
- HDD bore excavated materials; and
- Urban deposits (described as *soft brown, slightly sandy, slightly gravelly to clay. Sand is fine to coarse, and gravel is subangular* in Table 21.17 of Volume 4, Chapter 21: Land and Soils).

A summary of the excavated materials associated with the construction of the onshore infrastructure for the proposed development, along with estimated reuse and export quantities, is provided in Table 31.10. In total, it is estimated that approximately 300,500 tonnes of material will be excavated to facilitate construction of the onshore infrastructure for the proposed development. It is estimated that approximately 72,600 tonnes of this material will be reused within the site and approximately 227,900 tonnes of this material will be exported from the site. The quantities presented in Table 31.10 are rounded to the nearest 10.

Table 31.10 Estimated quantities of onshore excavation materials

Material	Landfall			Grid facility			Onshore cable route		
	Excavated (tonnes)	Reused (tonnes)	Exported (tonnes)	Excavated (tonnes)	Reused (tonnes)	Exported (tonnes)	Excavated (tonnes)	Reused (tonnes)	Exported (tonnes)
Topsoil	10,370	6,630	3,740	27,030	7,990	19,040	29,750	23,460	6,290
Subsoil	3,200	1,400	1,800	63,000	1,600	61,400	9,800	4,400	5,400
Surface course (asphalt)	0	0	0	0	0	0	4,080	2,880	1,200
Base / binder course (asphalt)	0	0	0	0	0	0	16,080	11,280	4,800
Sub-base (crushed stone)	0	0	0	0	0	0	18,260	12,980	1,760
Capping (crushed stone) incl. compound / access track stone	0	0	0	0	0	0	27,500	0	27,500
Sub-grade	0	0	0	0	0	0	66,220	0	66,200
HDD bore material	7,600	0	7,600	0	0	0	17,600	0	17,600
Total	**21,170**	**8,030**	**13,140**	**90,030**	**9,590**	**80,440**	**189,290**	**55,000**	**134,290**

In line with current practice in Ireland, surplus materials and wastes from the excavation works for the onshore infrastructure will be managed as follows:

- Where reasonably practicable, naturally occurring excavated material will be reused within construction in the proposed development in accordance with Article 3 of the Waste Management Act 1996, as amended;
- Excavation material will be used as engineering material within the proposed development and on other projects requiring the types of materials generated to the maximum possible extent, through Regulation 27. Reuse of topsoil and excavated material within the proposed development is proposed, where practicable. The material will also be subject to testing to ensure it is suitable for its proposed end use;
- Should material require recycling prior to reuse in accordance with the law, it will be delivered to facilities which are authorised under the Waste Management Act 1996, as amended (i.e., which hold a certificate of registration, waste facility permit and / or EPA waste licence as appropriate). Examples of recycling / recovery activities for excavation material include:
  - Processing of stone to produce construction aggregate;
  - Backfilling of quarries; and
  - Raising land for site improvement or development.
- Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation;
- Screening of material may be undertaken for the proposed development, which will be a decision for the appointed contractor; and
- In accordance with the law, all wastes removed from site will be transported by the holder of the appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007.

All material from the excavation works will need to be tested by the appointed contractor for quality and contamination. During onshore excavation works, there is the potential for encountering contaminated material (including potential asbestos containing materials). However, the majority of the samples taken during the project specific ground investigation for the proposed development indicated the presence of inert materials, with just three samples recovered classified as non-hazardous (TP09 – Landfall, TP21 – Blakes Cross and TP108 – Onshore Cable Route) and two samples recovered classified as hazardous (ST02 and ST31). Refer to Volume 4, Chapter 21: Land and Soils for further details.

Material that is not contaminated may be reused as general fill material in the construction works under the provisions of Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended). Where material is proposed to be reused on site, it will be stored within the onshore development area prior to its reuse in the construction works. Material will be stored primarily at the substation contractor compound or at the temporary cable contractor compound, depending on the type of material and intended location of end use, as outlined in the Onshore Construction Chapter. Material that meets the necessary acceptance criteria but is not required on site will be delivered to an authorised soil recovery facility.

It will be the responsibility of the appointed contractor to secure agreements for acceptance of surplus excavation materials from the proposed development in authorised and regulated facilities, in accordance with the Waste Management Act 1996 (as amended), and the relevant regulations.

Material that requires recycling will be sent to authorised waste facilities and may be used in accordance with Regulation 28 of the European Union (Waste Directive) Regulations 2011 (as amended). Regulation 28 sets the criteria which must be complied with, and which the EPA must use to determine if a waste reaches “end of waste” status and becomes a material.

Where excavated material containing hazardous substances is discovered as part of the proposed development, this will be delivered to a facility authorised to accept hazardous wastes. It may also be exported from Ireland for treatment, recovery or disposal.

Export of hazardous waste from the proposed development outside of the State is subject to a Europe-wide control system founded on Regulation (EC) No. 1013/2006 of the European Parliament and of the Council of 14 June 2006 on Shipments of Waste ('the Transfrontier Shipment Regulations'). This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007, as amended (S.I. No. 419 of 2007), which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. Export of hazardous waste from site outside the state will comply with the procedures set out in this legislation.

Considering the estimated quantity of excavated material to be exported from the site during the onshore excavation works, the significance criteria presented in Table 31.1 and the available treatment capacity for the C&D waste generated (refer to Section 31.3.1), the potential impact of the onshore excavation works, in the absence of mitigation, is negative, moderate and short-term, which is not significant in EIA terms.

31.5.3.3 Onshore Resource Use

The construction of the onshore infrastructure for the proposed development will require the importation of several key construction materials for the proposed development works. This material will include items such as concrete, crushed stone, high density polyethylene (HDPE) ducting for the installation of the cables, road paving materials, steel and power cables.

The estimated quantity of construction materials required for the onshore infrastructure works are presented in Table 31.11.

Table 31.11 Estimated quantity of construction materials required for onshore infrastructure

Material	Estimated quantity
Surface course (asphalt)	1,900 tonnes
Base / binder course (asphalt)	7,700 tonnes
Sub-base (crushed stone)	18,900 tonnes
Capping (crushed stone) incl. compound / access track stone	64,900 tonnes
Cement bound granular mixture	68,400 tonnes
Water (HDD)	37,800 m^3
Bentonite (HDD)	1,900 tonnes
Concrete for HDD anchor block (per HDD compound)	3,100 tonnes
Concrete (for substation foundation / slabs)	4,800 tonnes
Steel reinforcement (for substation foundations / slabs)	150 tonnes
Structural steel (for substation buildings)	300 tonnes
Steel cladding (for substation buildings walls / roofs)	10,500 m^2
HDPE ducting	317,000 m
Power cables (onshore export circuit – comprising various materials, including metals, plastics and composite materials)	15,000 m
Power cables (onshore transmission circuit – comprising various materials, including metals, plastics and composite materials)	214,800 m
Earthing cable (comprising various materials, including metals, plastics and composite materials)	78,600 m
Fibre optic cable (comprising various materials, including metals, plastics and composite materials)	78,600 m
Concrete (for joint bays, link boxes, comms chambers)	21,600 tonnes
Temporary access tracks / contractor compound bases	47,300 m^2

The quantities of materials listed in Table 31.11 represent a very small proportion of the Irish quantities manufactured per year.

As an example, the estimated quantity of concrete required for the construction of the onshore infrastructure for the proposed development represents less than one percent of the total quantity produced in Ireland per annum (refer to Section 31.3.2).

Importation of material to the proposed development site will be carried out throughout the construction phase, with different materials being required at different times. The main direct impacts associated with the importation of construction materials arise from the gathering / manufacture of the materials, and that once the materials are used within the proposed development, they are no longer available for other uses. There will also be impacts associated with the importation of materials through the requirement for the use of heavy goods vehicles for delivery of the material and the use of materials. Impacts on other environmental aspects are addressed in Volume 4, Chapter 24: Traffic and Transportation, Volume 5, Chapter 30: Noise and Vibration, Volume 5, Chapter 27: Air Quality and Volume 5, Chapter 28: Climate.

The majority of construction materials will be locally and nationally sourced, with a ready supply available. As the materials required for the construction phase of the proposed development are generally readily available and the quantities of the materials required constitute a small proportion of the quantities produced per annum in Ireland, the potential effect associated with onshore resource use, in the absence of mitigation, is negative, slight and permanent, which is not significant in EIA terms.

31.5.3.4 Onshore General Construction Waste

Construction works, site offices and temporary works facilities are also likely to generate construction waste.

General construction waste can vary significantly from site to site but typically would include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Asphalt / tar;
- Metals; and
- Liquid wastes (wheel-wash run-off, sanitary waste from portable toilets).

The hazardous waste streams which could arise from construction activities will include the following:

- Bituminous material;
- Waste electrical and electronic components;
- Cable materials;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

In the case of the proposed development, the most likely type of general construction waste arising from the construction of the onshore infrastructure will be bituminous material from road excavation, surplus concrete and unusable or damaged ducting segments which will arise on site. Quantities of these materials are estimated to be small. As an example, concrete waste is assumed to be between approximately 5% to 10% of concrete construction materials delivered to site (WRAP, 2014). There is adequate capacity for the management of such wastes. Segregation facilities will be provided to ensure that recovery and recycling of such wastes are maximised.

Liquid wastes (such as sanitary waste or oils / lubricants) will be contained and dispatched off-site for disposal at appropriately licensed or permitted facilities.

There will also be impacts associated with the removal of waste material off site through the requirement for the use of heavy goods vehicles. Impacts on other environmental aspects are addressed in Volume 4, Chapter 24: Traffic and Transportation, Volume 5, Chapter 30: Noise and Vibration, Volume 5, Chapter 27: Air Quality and Volume 5, Chapter 28: Climate.

Considering the minor quantities of onshore general construction waste that will be generated during the construction phase, the significance criteria presented in Table 31.1, and the available treatment capacity for the C&D waste generated (refer to Section 31.3.1), the potential impact of onshore general construction waste, in the absence of mitigation, is negative, not significant and short-term, which is not significant in EIA terms.

31.5.3.5 Onshore Municipal Waste

Minor quantities of municipal waste will be generated by construction workers during the construction phase (e.g., from site offices and welfare facilities). Segregation facilities will be provided at all working areas, if necessary, to ensure that recovery and recycling of such wastes is maximised.

Considering the minor quantities of onshore municipal waste that will be generated during the construction phase, the significance criteria presented in Table 31.1, and the available treatment capacity for municipal waste, the potential impact of onshore municipal waste, in the absence of mitigation, is negative, not significant and short-term, which is not significant in EIA terms.

31.5.3.6 Summary of Onshore Construction Phase Effects

A summary of the potential (pre-mitigation and monitoring) effects during the construction phase of the onshore infrastructure of the proposed development is set out in Tabel 31.12.

Table 31.12 Summary of potential onshore construction phase effects (pre-mitigation and monitoring)

Assessment topic	Potential effect
Onshore site clearance	Negative, not significant and short-term
Onshore excavation	Negative, moderate and short-term
Onshore resource use	Negative, slight and permanent
Onshore general construction waste	Negative, not significant and short-term
Onshore municipal waste	Negative, not significant and short-term

31.5.4 Operational Phase

31.5.4.1 Offshore C&D Waste

Occasional inspections of the OSP, the inter-array and the offshore export cable will be carried out and where necessary, repair, replacement or reburial works will be required. Regularly scheduled maintenance works will also be carried out at the WTGs, with occasional repair and / or replacement of components required, e.g., pumps, gearbox, blades. Occasional maintenance works will also be carried out at the OSP and WTP foundations.

Refer to the Offshore Description Chapter for further details on the offshore operation and maintenance activities proposed.

The above activities will generate minor quantities of C&D waste (e.g., steel, plastic, fibreglass). Considering the minor quantities of C&D waste that will be generated offshore during the operational phase and the available treatment capacity for this waste, the potential impact of offshore operational waste, in the absence of mitigation, is negative and slight, which is not significant in EIA terms.

31.5.4.2 Onshore C&D Waste

The grid facility, which comprises the compensation substation and Bremore substation, will be operated remotely and will typically be unmanned during operation. Occasional visits to the grid facility will be required for inspection and maintenance work. Occasional visits to joint bays along the onshore cable route will also be required for inspection and maintenance of the cable.

Refer to the Onshore Description Chapter for further details on the onshore operation and maintenance activities proposed.

The above activities will generate minor quantities of C&D waste (e.g., metals, plastics and composite materials from cables). Considering the minor quantities of C&D waste that will be generated onshore during the operational phase and the available treatment capacity for this waste (refer to Section 31.3.1), the potential impact of onshore operational waste, in the absence of mitigation, is negative, not significant and long-term, which is not significant in EIA terms.

31.5.4.3 Offshore and Onshore Municipal Waste

Minor quantities of municipal waste will also be generated by employees, contractors and visitors both working on and visiting the offshore and onshore infrastructure during the operational phase.

Considering the minor quantities of offshore and onshore municipal waste that will be generated during the operational phase and the available treatment capacity for municipal waste, the potential impact of offshore and onshore municipal waste, in the absence of mitigation, is negative and not significant, which is not significant in EIA terms.

31.5.4.4 Offshore and Onshore Resource Use

Minor quantities of resources (e.g., steel, plastic, fibreglass) will be required for the offshore and onshore operational and maintenance activities during the operational phase. Most materials will be required due to the replacement of components. The majority of the materials required will be locally and nationally sourced, with a ready supply available, although some specialist materials (e.g., blades from WTGs) will be sourced internationally.

As the materials required for both the onshore and the offshore elements of the operational phase are generally readily available and the quantities of the materials required will constitute a small proportion of the quantities produced per annum in Ireland, the potential impact associated with offshore and onshore resource use, in the absence of mitigation, is negative and not significant, which is not significant in EIA terms.

31.5.4.5 Summary of Operational Phase Impacts

A summary of the potential (pre-mitigation and monitoring) effects during the operational phase of the proposed development is set out in Table 31.13.

Table 31.13 Summary of potential operational phase effects (pre-mitigation and monitoring)

Assessment topic	Potential effect
Offshore C&D waste	Negative, slight
Onshore C&D waste	Negative, not significant and long-term
Offshore and onshore municipal waste	Negative, not significant
Offshore and onshore resource use	Negative, not significant

31.5.5 Decommissioning

The operational life of the proposed development is anticipated to be up to 35 years. Once the proposed development has reached the end of its operational life, a decision will be made regarding decommissioning. A Rehabilitation Schedule will be prepared taking into consideration the latest technological advances as well as legislative and environmental requirements at the time of decommissioning.

31.5.5.1 Offshore C&D Waste

Decommissioning of the offshore infrastructure will include the removal of the OSP, WTGs (and their components) and the removal of foundations. Decommissioning activities will typically be undertaken in reverse, with the removal of blades, nacelle, turbine, towers and transition pieces to be followed by the removal of foundations and associated subsurface infrastructure. It is envisaged that, where appropriate, buried assets such as cables will be left in situ when the proposed development is decommissioned. However, some cables may need to be wholly or partially removed.

The above offshore decommissioning activities will generate minor quantities of C&D waste (e.g., steel, plastic, fibreglass, metals, plastics and composite materials) and waste electrical and electronic equipment (WEEE). Further information regarding the decommissioning of the offshore infrastructure is presented in the Offshore Description Chapter.

All C&D waste and WEEE generated during the decommissioning of the offshore infrastructure will be returned to port and delivered to an authorised recycling, recovery or disposal facility that holds a certificate of registration, waste facility permit and / or EPA waste licence. All relevant waste management legislation in force at the time of the decommissioning works will be adhered to in the management and transportation of any WEEE generated.

Considering the available treatment capacity for the types of waste that will be generated during the decommissioning of the offshore infrastructure, the potential impact of offshore decommissioning waste, in the absence of mitigation, is negative and moderate, which is not significant in EIA terms.

31.5.5.2 Onshore C&D Waste

For the decommissioning of the onshore infrastructure, while the compensation substation within the grid facility will be decommissioned, the Bremore substation will not as it will form part of the wider transmission network owned by EirGrid. The decommissioning of the compensation substation will involve the demolition of the building fabric and the removal of all equipment, as required. The cabling at the compensation substation will be removed but below ground ducting will remain in place.

All above ground structures (e.g., access track, marker posts) between the transition joint bay and the grid facility will be removed during the decommissioning phase and the sites will be returned to their previous state. The onshore cable route will not be decommissioned as it will also form part of the wider transmission network.

The above onshore decommissioning activities will generate minor quantities of C&D waste and WEEE. Further information regarding the decommissioning of the onshore infrastructure is presented in the Onshore Description Chapter.

All waste generated during the decommissioning of the onshore infrastructure will be delivered to an authorised recycling, recovery or disposal facility that holds a certificate of registration, waste facility permit and / or EPA waste licence. All relevant waste management legislation in force at the time of the decommissioning works will be adhered to in the management and transportation of any WEEE generated.

Considering the available treatment capacity for the types of waste that will be generated during the decommissioning of the onshore infrastructure, the potential impact of onshore decommissioning waste, in the absence of mitigation, is negative, slight and short-term, which is not significant in EIA terms.

31.5.5.3 Summary of Decommissioning Phase Impacts

A summary of the potential (pre-mitigation and monitoring) effects during the decommissioning phase of the of the proposed development is set out in Table 31.14.

Table 31.14 Summary of potential decommissioning phase effects (pre-mitigation and monitoring)

Assessment topic	Potential effect
Offshore C&D waste	Negative, moderate
Onshore C&D waste	Negative, slight and short-term

31.6 Mitigation and Monitoring Measures

No significant negative effects are anticipated during either the construction phase, the operational phase or the decommissioning phase of the proposed development. Nonetheless, a suite of mitigation and monitoring measures is outlined below. These measures will ensure that the sustainable resource and waste management principles outlined in Section 31.2.1, including circular economy principles related to the use of resources and adherence to the waste hierarchy, are implemented.

31.6.1 Construction Phase

Every reasonable effort will be made to ensure that significant environmental effects will be prevented or reduced during the construction phase of the proposed development.

An offshore waste management procedure is included in the Offshore EMP (Volume 8, Appendix 6.1) and a CRWMP is included in the Onshore CEMP (Volume 8, Appendix 9.1). These plans meet the requirements outlined in the Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects (EPA, 2021) as well as the requirements outlined in Annexes IV and V of the MARPOL Convention. The appointed contractor will be obliged to further develop, implement and maintain the waste management plan and CRWMP during the construction phase.

31.6.1.1 General

The key principles underlying the waste management plan and the CRWMP will be to minimise waste generation and to segregate waste at source. The measures to achieve these which are relevant to both the offshore and onshore aspects of the proposed development include:

- Where waste generation cannot be avoided, waste disposal will be minimised;
- Where possible, recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation by clearly labelling waste types;
- All staff on-site will be trained on how to minimise waste (i.e., training, induction, inspections and meetings);
- Materials on-site will be correctly and securely stored;
- Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility;
- The appointed contractor will record the quantity in tonnes and types of waste and materials leaving the site during the construction phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered, which is recycled and which is disposed of;
- Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation;
- Waste generated from on-site offices will be source separated at least into residual waste, dry mixed recyclables and organic waste; and
- The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., certificate of registration, waste facility permit and / or EPA waste licence).

31.6.1.2 Offshore

In addition to the measures proposed in Section 31.6.1.1, the management of wastes generated during the offshore construction works will be undertaken in such a way as to minimise waste generation and segregate waste at source. The measures to achieve these aims have been prepared in accordance with the requirements outlined in Annexes IV and V of the MARPOL Convention and include:

- Vessels will operate in line with international agreements such as the MARPOL Convention to manage on-board waste streams including wastewater and sewage;
- Any waste generated during offshore construction works will be segregated and stored in designated containers and returned to port by the appointed contractor to be collected and delivered to an authorised waste facility; and
- Waste arising from the works associated with the offshore elements of the proposed development will be segregated based on its classification as non-hazardous or (potentially) hazardous on board the vessels.

31.6.1.3 Onshore

For the management of resources and waste generated from the onshore construction works, specific measures have been adopted and included within the CRWMP. These include:

- Paints, sealants and hazardous chemicals will be stored in secure, bunded locations;
- Opportunities for the reuse of materials, by-products and wastes will be sought throughout the construction phase;
- Possibilities for reuse of clean non-hazardous excavation material as fill on the site will be considered following appropriate testing to ensure material is suitable for its proposed end use;
- Where non-hazardous excavation material cannot be reused within the proposed development works, material will be sent for recycling or recovery;
- Any identified contaminated material will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross contaminate clean soils elsewhere throughout the site;
- If encountered, any potential asbestos during the construction phase will be managed using standard health and safety measures as outlined in 'Asbestos-containing Materials (ACMs) in Workplaces: Practical Guidelines on ACM Management and Abatement' (HSA, 2013). This document states that "removal of asbestos from contaminated soil will require a specialist asbestos contractor for any friable asbestos to be removed" and "a risk assessment by an independent competent person should determine the most appropriate control measures and remediation strategies" (HSA, 2013);
- Paints, sealants and hazardous chemicals will be stored in secure, bunded locations;
- Where excavation material cannot be reused within the proposed development, the appointed contractor will endeavour to send material offsite for reuse as a by-product, recovery or recycling, in so far as is reasonably practicable;
- The appointed contractor will ensure that any off-site interim storage facilities for excavation material have the appropriate certificate of registration, waste facility permit and / or EPA waste licence in place;
- Where Regulation 27 notifications are required in relation to the proposed development, the appointed contractor will complete and submit these Regulation 27 notifications to the EPA for by-product reuse; and
- The site will be maintained to prevent litter and regular litter picking will take place throughout the site.

31.6.2 Operational Phase

Materials will be reused and recycled throughout the proposed development site and resources required will be locally and nationally sourced, to the maximum extent possible, thereby minimising potential impacts. The sustainable resource and waste management principles detailed in Section 31.2.1 will be implemented to ensure that circular economy principles are met and that the waste hierarchy is adhered to.

No additional mitigation or monitoring measures are considered necessary.

31.6.3 Decommissioning

The mitigation and monitoring measures outlined herein for the construction phase, will be applied as appropriate, during the decommissioning phase.

In advance of the decommissioning phase, a Rehabilitation Schedule (Appendix 6.2) will be prepared. The Rehabilitation Schedule will cover the same topics and will be based on the same general principles as those included in the construction phase waste management plan included in the Offshore EMP (Volume 8, Appendix 6.1) and the construction phase CRWMP included in the Onshore CEMP (Volume 8, Appendix 9.1).

31.7 Residual Effects

31.7.1 Construction Phase

The construction phase of the proposed development is not predicted to give rise to any significant residual effects with the adoption of sustainable resource and waste management principles. Nonetheless, appropriate mitigation measures have been identified to further ensure that the sustainable resource and waste management principles outlined in Section 31.2.1, including circular economy principles related to the use of resources and adherence to the waste hierarchy, are implemented.

A summary of the predicted residual effects during the construction phase, following the implementation of the appropriate mitigation measures, is set out in Table 31.15 and Table 31.16.

Table 31.15 Summary of predicted offshore construction phase residual effects

Assessment topic	Potential effect (pre-mitigation and monitoring)	Residual effect (post mitigation)
Offshore seabed preparation	Negative, slight	Negative, not significant
Offshore installation	Negative, slight	Negative, slight
Offshore resource use	Negative, slight	Negative, slight
Offshore general construction waste	Negative, slight	Negative, not significant
Offshore municipal waste	Negative, not significant	Negative, not significant

Table 31.16 Summary of predicted onshore construction phase residual effects

Assessment topic	Potential effect (pre-mitigation and monitoring)	Residual effect (post mitigation)
Onshore site clearance	Negative, not significant and short-term	Negative, not significant and short-term
Onshore excavation	Negative, moderate and short-term	Negative, moderate and short-term
Onshore resource use	Negative, slight and permanent	Negative, slight and permanent
Onshore general construction waste	Negative, not significant and short-term	Negative, not significant and short-term
Onshore municipal waste	Negative, not significant and short-term	Negative, not significant and short-term

31.7.2 Operational Phase

The operational phase of the proposed development is not predicted to give rise to any significant residual effects with the adoption of sustainable resource and waste management principles.

Nonetheless, appropriate mitigation measures have been identified to further ensure that the sustainable resource and waste management principles outlined in Section 31.2.1, including circular economy principles related to the use of resources and adherence to the waste hierarchy, are implemented.

A summary of the predicted residual effects during the operational phase, following the implementation of the appropriate mitigation measures, is set out in Table 31.17.

Table 31.17 Summary of predicted operational phase effects

Assessment topic	Potential effect (pre-mitigation and monitoring)	Residual effect (post mitigation)
Offshore C&D waste	Negative, slight	Negative, not significant
Onshore C&D waste	Negative, not significant and long-term	Negative, not significant and long-term
Offshore and onshore municipal waste	Negative, not significant	Negative, not significant
Offshore and onshore resource use	Negative, not significant	Negative, not significant

31.7.3 Decommissioning

The decommissioning phase of the proposed development is not predicted to give rise to any significant residual effects with the adoption of sustainable resource and waste management principles. Nonetheless, appropriate mitigation measures have been identified to further ensure that the sustainable resource and waste management principles outlined in Section 31.2.1, including circular economy principles related to the use of resources and adherence to the waste hierarchy, are implemented.

A summary of the predicted residual effects during the decommissioning phase, following the implementation of the appropriate mitigation measures, is set out in Table 31.18.

Table 31.18 Summary of predicted decommissioning phase effects

Assessment topic	Potential effect (pre-mitigation and monitoring)	Residual effect (post mitigation)
Offshore C&D waste	Negative, moderate	Negative, slight
Onshore C&D waste	Negative, slight and short-term	Negative, not significant and short-term

31.8 Transboundary Effects

While waste will be generated during the construction phase, operational phase and decommissioning phase of the proposed development, no significant negative effects will arise.

Any offshore waste that is generated from the proposed development will be managed at the appropriate port facility before being sent for recycling, recovery or disposal at an authorised waste facility.

Onshore waste generated from the proposed development will be reused or delivered to recycling, recovery or disposal facilities located within the EMWR that are authorised in accordance with the Waste Management Act, 1996, as amended, and hold a certificate of registration, waste facility permit and / or EPA waste licence.

There is the potential for hazardous waste to be generated from the proposed development that will require treatment overseas. However, as noted in Section 31.3.1.1, the percentage of hazardous waste generated in Ireland that is subsequently treated in Ireland, rather than exported abroad, is increasing. Given the minimal quantities of hazardous waste that are predicted to be generated from the proposed development along with the improving treatment of hazardous waste domestically within Ireland, no significant transboundary effects are anticipated for the overseas management of hazardous waste.

No significant transboundary effects on resource and waste management are anticipated to arise from the proposed development.

31.9 Cumulative Effects

A long list of "other projects" which were deemed to be potentially relevant to be included in the cumulative impact assessment was compiled (refer to Volume 6, Chapter 38: Cumulative and Inter-related Effects (hereafter referred to as the 'Cumulative and Interrelated Effects Chapter')). A screening exercise of the "long list" was carried out in order to determine whether each of those other projects have the potential to give rise to likely significant cumulative effects with the proposed development from a resource and waste perspective. Many of the other projects were screened out for a number of reasons including their location, scale and nature of the project. Those projects which were "screened in" were carried forward for assessment. The results of the assessment are presented in the Cumulative and Interrelated Effects Chapter.

The assessment concluded an outcome of a direct, negative, significant, short-term cumulative effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction phase due to an increased demand on waste recovery and / or disposal sites. This is as a result of the potential cumulative effect of a Tier 3 onshore project that was "screened in" to the assessment should the construction of the proposed development proceed in parallel or overlap with the construction of this project.

As noted in Section 31.7.1, waste management effects from the proposed development alone on the capacity of waste management facilities and waste industry trends in Ireland during the construction phase due to an increased demand on waste recovery and / or disposal sites will range from direct, negative, not significant to direct, negative, moderate.

The assessment concluded that there are no likely significant direct or indirect cumulative effects on resource use during the construction phase, resource use and waste management during the operational phase, or resource use and waste management during the decommissioning phase of the proposed development.

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